

**REMARKS**

The Final Office Action mailed on October 11, 2006, and the Advisory Action mailed on January 26, 2007, have been reviewed and the comments of the Patent and Trademark Office have been considered. Prior to this paper, claims 22-43 were pending. By this paper, Applicants do not cancel or add any claims. therefore, claims 22-43 remain pending.

The independent claims stand amended to recite that the first beam has a same frequency exiting the lumen as compared to entering the lumen. Support for this amendment may be found, among other places, at paragraph 0025 of the application as originally filed, which teaches that the lumen contains water. It is inherent that a beam of light passing through water in the lumen according to the present invention will not undergo a frequency shift, and the skilled artisan would have known this at the time that the present application was filed. Accordingly, the amendments to the independent claims are supported by the application as originally filed.

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

**Claim Rejections Under 35 U.S.C. §103(a)**

In the Office Action, Claims 22-28, 30-38 and 40-43 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Yin (U.S. Patent No. 6,386,050) in view of Crosswy (U.S. Patent No. 3,552,855), and claims 29 and 39 are rejected in view of this combination when further combined with Johnson (U.S. Patent No. 3,511,227). In response, in order to advance prosecution, and without prejudice or disclaimer, Applicants have amended the claims as seen above, and respectfully submit that these claims are allowable for at least the following reasons.

Applicants rely on MPEP § 2143, which states that:

[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

It is respectfully submitted that at least the first criteria of MPEP § 2143 was not met in the Office Action, and that the third criteria cannot be met in view of the cited references at least after the above proffered claim amendments are entered.

The Cited References Do Not Suggest All Claim Recitations

Even if the first requirement of MPEP § 2143 were to be considered satisfied in the Office Action (which it is not, as explained below), the cited references still do not meet the third requirement, which is that “the prior art reference (or references when combined) must teach or suggest all the claim limitations.”

The independent claims now recite that the first beam has a same frequency exiting the lumen as compared to entering the lumen. In an exemplary embodiment of the invention as claimed as depicted in Fig. 4, the beam 111 (the first beam) passes through the right side conduit wall, enters the lumen 32, travels exits the lumen 32, and passes through the left side conduit wall. When the beam 111 enters the lumen 32, it has a frequency that is the same as when the beam 111 exits the lumen 32. That is, the frequency of the beam does not change as a result of passage of the beam 111 through the lumen 32.

In contrast, the proffered combination of Yin and Crosswy, assuming such combination was feasible, would result in a change in frequency of the beam as it passes through the lumen. Thus, the cause of the intensity variations at the detector of Applicants’ optical system is different from that resulting from the optical system obtained from the proffered combination. That is, the proffered combination results in a different physical processes than that of Applicants’ invention.

Applicants’ process is the result of a phase delay of one of the beams with respect to

the other due to the passing of one of the beams through a medium of altered density (the thermal marker). In Applicants' claimed device, *the first beam does not undergo a frequency shift as the beam passes through the lumen* The process causing the intensity variation in the optical system resulting from the combined art of Crosswy and Yin is *the heterodyne process where one or both of the beams have been shifted in frequency as a result of passing through the optical system*. This shifting in frequency in the combined system of Crosswy and Yin is caused by the scattering of a portion of the light in one of the beams from *moving particles*. Indeed, Crosswy specifically teaches that "conventional Doppler shifted frequency detecting means" are utilized. (Crosswy, col. 3, lines 67-68.) (See also the background of Crosswy, at col. 2, lines 1-32, where he describes the physical phenomenon he relies on – frequency shift for the Doppler effect.)

In sum, even if the first requirement of MPEP § 2143 were to be considered satisfied, the third requirement of MPEP § 2143 is not satisfied by the cited references, because the cited references do not teach each and every element of the present invention. Thus, the present claims are allowable.

Lack of Suggestion or Motivation to Modify or Combine the References

MPEP § 2143.01 states that "the prior art *must* suggest the desirability of the invention." (MPEP § 2143.01, subsection 1, emphasis added.) The Office Action relies solely on the Applicants' disclosure for motivation to modify the references to arrive at the invention of the independent claims. The Office Action cites nothing in the prior art that provides motivation to modify the references to arrive at the invention of the independent claims.

Specifically, the Office Action states that it "would have been obvious to include the combiner to *detect the signals simultaneously and accurately*." (Emphasis added.) First, it is not clear what is meant by "signals." Second, there is nothing that indicates that the combiner of Crosswy detects anything more accurately than the device of Yin. Indeed, Yin represents an advancement in the art of monitoring fluid flow *filed three decades after the filing date of Crosswy*. It is respectfully submitted that the ordinary artisan would view the

components utilized in Crosswy's patent, which are based on 1960's technology, as vastly less accurate than the components of Yin. (Applicants submit that it would not have been obvious to combine Johnson, which was filed in 1967, with Yin and Crosswy, for at least the same reasons.)

Third, assuming *arguendo* that the Office Action proffers the combiner to simultaneously detect *beams* (as opposed to "signals"), this argument is circular. That is, simply because a "combiner" simultaneously detects beams (which is what a "combiner" does) does not provide motivation to modify another reference to include a combiner. In this regard, all prior art components have a known function. If obviousness to combine two references could be established by merely pointing to a prior art device that has given function and asserting that the ordinary artisan would have combined another prior art device to achieve that function, the first requirement of MPEP § 2143 would be completely vitiated. By analogy to the Wright Flier, according to this logic, it would have been obvious in 1899 to combine an airfoil with an internal combustion engine because airfoils can be used to produce lift.

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MPEP § 2143.01, subsection 6 states that "the proposed modification cannot change the principle of operation of a reference – If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810 (CCPA 1959)." In *Ratti*, the CCPA held that the "suggested combination of references would require a substantial reconstruction and redesign of the elements shown in the primary reference." This substantial redesign would have resulted in changing a rigid seal to a resilient seal. Thus, a reference cannot be modified to render an invention obvious if the modification changes a principle of operation of the reference.

With the above in mind, it is respectfully submitted that because the teachings of Yin rely on separate beam detection (i.e., he does not simultaneously combine beams, but instead discretely detects the beams), and the teachings of Crosswy rely on the combination of beams, utilizing a combiner in Yin would change the principle of operation of Yin. Further, the

teachings of Crosswy rely on the principle of the Doppler effect, incorporating Crosswy into Yin would change the principle of operation of Yin for yet another reason. Because modifying Yin as proffered in the Office Action changes the principle of operation of Yin, just as changing the rigid seal to a resilient seal was found to change the principle of operation in *Ratti*, “the teachings of [Crosswy] are not sufficient to render the claims *prima facie* obvious.” (MPEP § 2143.01, emphasis added.)

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In summary, because of the lack of suggestion or motivation in the prior art to modify the reference, the first requirement of MPEP § 2143 has not been met and, hence, a *prima facie* case of obviousness has not been established.

Prior Arguments of the Response of July 12, 2006

Applicants submit that the claims are allowable for the pertinent reasons detailed in their Response of July 12, 2006, those pertinent arguments being incorporated herein by reference in their entirety.

Conclusion

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

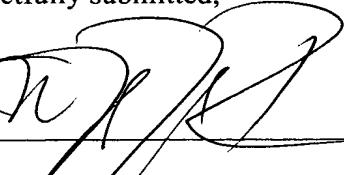
The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for

such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Examiner Alsomiri is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

By



Martin J. Cosenza  
Attorney for Applicant  
Registration No. 48,892

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FOLEY & LARDNER LLP  
Customer Number: 22428  
Telephone: (202) 295-4747  
Facsimile: (202) 672-5399